

Small Business Innovation Research and Small Business Technology Transfer Programs Phase I Solicitation FY-2002 (SBIR/STTR)

Program Solicitation

NSF-02-056

DIRECTORATE FOR ENGINEERING
DIVISION OF DESIGN, MANUFACTURE, AND INDUSTRIAL INNOVATION
SMALL BUSINESS INNOVATION RESEARCH (SBIR)

DIRECTORATE FOR BIOLOGICAL SCIENCES
DIRECTORATE FOR COMPUTER AND INFORMATION SCIENCE AND ENGINEERING
DIRECTORATE FOR EDUCATION AND HUMAN RESOURCES
DIRECTORATE FOR GEOSCIENCES
DIRECTORATE FOR MATHEMATICAL AND PHYSICAL SCIENCES
DIRECTORATE FOR SOCIAL, BEHAVIORAL, AND ECONOMIC SCIENCES
OFFICE OF POLAR PROGRAMS

FULL PROPOSAL DEADLINE(S) :

June 12, 2002	Opening: March 1, 2002 Topics: Advanced Materials and Manufacturing Systems (AM) and Information-Based Technologies (IT)
January 22, 2003	Opening: October 1, 2002 Topics: Biotechnology (BT) and Electronics (EL)



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SUMMARY OF PROGRAM REQUIREMENTS

GENERAL INFORMATION

Program Title: Small Business Innovation Research and Small Business Technology Transfer Programs Phase I Solicitation FY-2002 (SBIR/STTR)

Synopsis of Program:

The SBIR/STTR Programs stimulate technological innovation in the private sector, by strengthening the role of small business concerns in meeting Federal research and development needs, increasing the commercial application of federally supported research results, and fostering and encouraging participation by socially and economically disadvantaged persons and women-owned small businesses.

Cognizant Program Officer(s):

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- Sara Nerlove, Information-Based Technologies, Program Manager, ENG, DMII, telephone: 703-292-7077, e-mail: snerlove@nsf.gov.

Applicable Catalog of Federal Domestic Assistance (CFDA) Number(s):

- 47.041 --- Engineering

ELIGIBILITY INFORMATION

- **Organization Limit:** Companies meeting the definition of a small business may submit proposals. See definition <http://www.eng.nsf.gov/sbirspeccs/Definitions/definitions.htm#sbcc>.

For a SBIR Proposal, a minimum of 66 2/3% of the research, as measured by the budget, must be performed by the small business concern and the balance may be out-sourced to a consultant or subcontract or a combination of the two.

For a STTR Proposal, a minimum 40% of the research, as measured by the budget, must be performed by the small business concern and a minimum of 30% of the research, as measured by the budget, must be performed by the research institution.

- **PI Eligibility Limit:** Primary employment must be with the small business concern at the time of an award. (See definition <http://www.eng.nsf.gov/sbirspeccs/Definitions/definitions.htm#PI>.)

PI must spend a minimum of 1-calendar month on a SBIR Phase I project and a minimum of 2-calendar months on a STTR Phase I project.

Employment releases and certifications of intent shall be required prior to award.

- **Limit on Number of Proposals:** None

AWARD INFORMATION

- **Anticipated Type of Award:** Fixed Price Grant
- **Estimated Number of Awards:** approximately 220 awards of which approximately 15 will be STTR awards (pending availability of funds)
- **Anticipated Funding Amount:** approximately \$22 million for SBIR Phase I and approximately \$3.5 million for STTR

PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

- **Full Proposals:** Deviations From Standard Preparation Guidelines
 - The program announcement/solicitation contains deviations from the standard Grant Proposal Guide (GPG) proposal preparation guidelines. Please see the full program announcement/solicitation for further information.

B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is not required.
- **Indirect Cost (F&A) Limitations:** Not Applicable.
- **Other Budgetary Limitations:** Other budgetary limitations apply. Please see the full program announcement/solicitation for further information.

C. Deadline/Target Dates

- **Letters of Intent (*optional*):** None
- **Preliminary Proposals (*optional*):** None
- **Full Proposals Deadline Date (s):**
 - June 12, 2002 Opening: March 1, 2002 Topics:
Advanced Materials and Manufacturing
Systems (AM) and Information-Based
Technologies (IT)
 - January 22, 2003 Opening: October 1, 2002 Topics:
Biotechnology (BT) and Electronics (EL)

D. FastLane Requirements

- **FastLane Submission:** Required
- **FastLane Contact(s):**
 - Cheryl Albus, Program Manager, telephone: 703-292-7051, e-mail: calbus@nsf.gov.
 - FastLane, telephone: 800-673-6188, e-mail: fastlane@nsf.gov.

PROPOSAL REVIEW INFORMATION

- **Merit Review Criteria:** National Science Board approved criteria. Additional merit review considerations apply. Please see the full program announcement/solicitation for further information.

AWARD ADMINISTRATION INFORMATION

- **Award Conditions:** Additional award conditions apply. Please see the program announcement/solicitation for further information.
- **Reporting Requirements:** Additional reporting requirements apply. Please see the full program announcement/solicitation for further information.

I. INTRODUCTION

The National Science Foundation (NSF), an independent agency of the Federal Government, invites eligible small business concerns to submit Phase I proposals for its 2002 Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs. NSF will support high quality projects on important scientific, engineering, or science/engineering education problems and opportunities that could lead to significant commercial and public benefit if the research is successful.

The significant difference between the SBIR and STTR programs is that STTR requires researchers at universities and other research institutions to play a significant intellectual role in the conduct of each STTR project. These university-based researchers, by joining forces with a small company, can spin-off their commercially promising ideas while they remain primarily employed at the research institution.

The SBIR/STTR solicitation is issued pursuant to the authority contained in Public Law 106-554. SBIR policy is provided by the Small Business Administration (SBA) through the SBA Policy Directive, January 26, 1993.

II. PROGRAM DESCRIPTION

The primary objective of the NSF SBIR/STTR Program is to increase the incentive and opportunity for small firms to undertake cutting-edge, high risk, high quality scientific, engineering, or science/engineering education research that would have a high potential economic payoff if the research is successful. The STTR program further expands the public/private partnership to include joint venture opportunities for small businesses and non-profit research institutions. A team approach is required in a STTR project where at least one research investigator is employed by the small business concern and at least one investigator is employed by the research institution.

Successful proposers will conduct Research and Development (R&D) on projects that either: 1) result in commercial application of a product, process or device concept in a 3-5 year time frame or, 2) greatly enhance the ability of scientists and engineers to conduct fundamental or applied research in a laboratory, field or research facility, or, 3) meet an important social benefit.

Projects should have:

- high potential commercial payback;
- high-risk efforts;
- research tools which meet significant commercial market needs; and,
- applications that result in multipurpose commercially viable functions.

For more in-depth program information please reference the following web site:
(<http://www.eng.nsf.gov/sbirspeccs/>)

III. ELIGIBILITY INFORMATION

Only firms qualifying as small business concerns are eligible to participate in the SBIR/STTR programs (see definition at <http://www.eng.nsf.gov/sbirspecs/Definitions/definitions.htm>). Socially and economically disadvantaged small business concerns and women-owned small business concerns are particularly encouraged to participate.

Proposals from joint ventures and partnerships are permitted, provided the entity created qualifies as a small business in accordance with this solicitation. Proposing firms are also encouraged to take advantage of research expertise and facilities that may be available to them at colleges, universities, national laboratories and from other research providers. Such collaborations may include research subcontracts, consulting agreements or the employment of faculty as "Senior Personnel" and of graduate or undergraduate students as assistants by the small business.

Unacceptable objectives: Proposed efforts directed toward systems studies; market research; commercial development of existing products or proven concepts; straightforward engineering design for packaging or adaptation to specific applications; studies, laboratory evaluations; incremental product/process improvements; and modifications of existing products without innovative changes are examples of projects that are not acceptable for SBIR/STTR. Projects determined unacceptable will be returned to the proposer without further consideration.

IV. AWARD INFORMATION

Under this solicitation, proposals may be submitted for funding up to \$100,000. SBIR projects run for 6 months and STTR projects for 12 months. The program expects to make approximately 220 (approximately 110 Phase I grants (including STTR) from the June submission and approximately 110 Phase I grants (including STTR) from the January submission). Anticipated award notification is six months from the proposal submission deadline date.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Full Proposal:

Proposals submitted in response to this program announcement/solicitation should be prepared and submitted in accordance with the general guidelines contained in the NSF *Grant Proposal Guide* (GPG). The complete text of the GPG is available electronically on the NSF Web Site at: <http://www.nsf.gov/cgi-bin/getpub?gpg>. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (301) 947-2722 or by e-mail from pubs@nsf.gov.

NOTE: Proposers are strongly encouraged to clearly enunciate the "Broader Impacts of the Proposed Activity" both in the proposal SUMMARY and the PROJECT DESCRIPTION section. In the latter, it may be diffused throughout the section, but should also be discussed in a separate subsection (within the total page length of 15 pages maximum). Please see the Proposal Review Information section below for details on the Broader Impacts criterion.

A.1. Responsiveness to NSF Topics. Designate one, and only one, of the topics. The topic name and the appropriate subtopic letter, MUST be identified on the cover sheet. A firm may submit separate proposals on different topics or different proposals on the same topic under this Solicitation. Proposals found to be non-responsive to the solicitation topics will be returned to the proposer without further consideration.

A.2. Phase I Proposal Objectives. A Phase I proposal must describe the research effort needed to investigate the feasibility of the proposed scientific or technical innovation. The objective of the Phase I effort is to determine whether the innovation has sufficient technical merit for proceeding into a Phase II project.

A.3. Phase I Project Requirements. The deliverable at the end of an SBIR/STTR Phase I grant is a technical report that summarizes the experimental and theoretical accomplishments vs. the proposed research. This report serves as the basis for a Phase II proposal.

A.4. General Requirements

A.4.1 Page Limitation. A Phase I SBIR/STTR proposal has page limitations based on the FastLane Forms. Many sections print as multiple pages. The page limitation is based on the following:

- Cover Sheet (includes certification page) - prints as multiple pages counts as 1 page
- Project Summary - counts as 1 page
- Table of Contents - counts as 1 page (automatically generated by FastLane)
- Project Description (letters of support do count toward the page count) - cannot exceed 15 pages (contains Parts 1-7)
- Budget(s) - prints as multiple pages counts as 1 page (includes subaward(s) and budget justifications)
- Current and Pending Support - prints as multiple pages counts as 1 page
- Facilities, Equipment and Other Resources - prints as multiple pages counts as 1 page
- Supplementary Docs - does not count
- List of Suggested Reviewers - does not count

For detailed instructions on the required margins and spacing see the Grant Proposal Guide (<http://www.nsf.gov/cgi-bin/getpub?nsf012>). Samples, videotapes, slides, or other ancillary items will not be accepted. Websites containing demonstrations, etc. may be cited in the proposal but reviewers are not required to access them.

A.4.2 Type Size and Spacing. The minimum font size shall be 10 point. The margins shall be a minimum of 1 inch. (Reference the Grant Proposal Guide <http://www.nsf.gov/cgi-bin/getpub?nsf012>). Proposals prepared with smaller font sizes will be rejected and returned without further consideration.

A.5. Required Format.

The required format of a Phase I proposal is described in the following paragraphs. Each proposal submitted to the NSF SBIR/STTR program must contain the following sections which correspond with the FastLane Forms.

The Following FastLane Forms will be used:

1. Cover Sheet
2. Project Summary
3. Table of Contents (automatically generated)
4. Project Description
5. References Cited
6. Biographical Sketches
7. Budgets (also required for each subaward)
8. Current and Pending Support
9. Facilities, Equipment and Other Resources
10. Supplementary Docs
11. List of Suggested Reviewers

A.5.1. Cover Sheet and Certification (counts as 1 page). The topic and subtopic fields must be completed on the cover sheet. All proposals must be electronically signed. For information regarding Electronic Signature reference the FastLane Home Page (<http://www.fastlane.nsf.gov>).

A.5.2. Project Summary (counts as 1 page). (*As of January 1, 2002 all proposals must include a statement concerning NSF review Criterion 2 in the Project Summary.*) The Project Summary should be written in the third person and should begin as follows: "This Small Business Innovation Research Phase I project...." or "This Small Business Technology Transfer Phase I project...". The summary must have the following components:

- 1) a summary limited to 200 words and should not reveal proprietary information. Include a brief identification of the problem or opportunity, the research objectives, a description of the research, and the anticipated results, and potential applications of the research.
- 2) a brief statement of the commercial applications of the research.
- 3) a listing of "Key" words. The key words should focus on areas of science, engineering, and or education that must describe the project's areas of application.
- 4) the topic name and subtopic, for example Advanced Materials / E.2
- 5) a statement concerning NSF review Criterion 2.

An edited version of the Project Summary will be available to the public if a proposal is awarded.

A.5.3 Project Description (Cannot exceed 15 pages). *A statement is required concerning NSF review Criterion 2, place this statement under Part 4 Commercial Potential.* The project description shall contain the following parts in the following order.

Part 1: Identification and Significance of the Innovation. The first paragraph shall contain (1) a clear and succinct statement of the specific innovation research proposed and (2) a brief explanation of how the innovation is relevant to meeting the need described in the subtopic narrative.

Part 2: Background and Phase I Technical Objectives. List and explain the key objectives to be accomplished in the course of the Phase I research, including the questions that must be answered to determine the technical and commercial feasibility of the proposed concept. It is important to show how the potential customer needs will be met if the research is successful. Therefore, Phase I proposers are strongly encouraged to consider commercial potential of their research at the same depth as the research problems.

Part 3: Phase I Research Plan. This section must provide a detailed description of the Phase I research approach. The description should include the following:

- a technical discussion of the proposed concept.
- what is planned and how the research will be carried out.
- the plan to achieve each objective.
- the sequence of experiments, tests, and computations involved in the measurement of those objectives.

Part 4. Commercial Potential. This section must provide information on the commercial potential of the proposed innovation and should address the following:

- The customer.
- The potential customer needs.
- How are those needs addressed today?
- Potential market size and trends.
- Competitors and alternatives to meet the customers' needs.
- Manufacture and delivery.
- Financing commercialization.

A useful reference for addressing the commercialization plan is the Business Plan for Scientists and Engineers offered by:

Dr. Jenny Servo, President
Dawnbreaker, Inc.
2117 Buffalo Road, Suite 193
Rochester, NY 14624
Phone: (716) 264-0510
Fax: (716) 264-0782

Note that Dawnbreaker, Inc. is a DOE, Navy, and NSF contractor with numerous years of experience in assisting small businesses in developing commercialization plans. This is a suggestion, not an endorsement.

Part 5. Company Information. In this section you are required to state the number of employees and the distribution into the following categories:

- Management Personnel
- Technical Personnel
- Administrative Personnel
- Manufacturing and/or Marketing Personnel

Indicate number of full time and part time employees.

Part 6. Consultants and Subawards/Subcontracts. Keep in mind that a SBIR Phase I project, requires a minimum of two-thirds of the research, as measured by the budget, to be performed by the small business concern. The STTR Phase I project, requires a minimum of 40% of the research, as measured by the budget, be performed by the small business concern and a minimum of 30% of the research, as measured by the budget, by the research institution, the remaining percentage can be allocated as appropriate to achieve the objectives of the project.

Consultant: Anticipated consultant services should be justified and information furnished on each individual's expertise, primary organizational affiliation, normal daily compensation rate, number of days of expected service, and how his or her efforts will contribute to the project. In addition, proposers must provide a signed statement from each consultant, whether paid or unpaid, confirming availability and time commitment, role on the project, and agreed consulting rate. Payment for a consultant's services, exclusive of expenses, may not exceed the consultant's normal rate or the daily maximum rate established annually by NSF, whichever is less. The NSF maximum consultant rate of \$498 per day is the limit for personal compensation and is exclusive of any indirect costs, travel, per diem, clerical services, fringe benefits, and supplies.

The signed consultant statements must be a part of the proposal. The consultant statements should be scanned into the proposal and placed under Part 6. The number of days on the project must be specified in the consultant's statement.

Subaward (also known as subcontract): If subawards (including contracts, subcontracts and other arrangements) are used for research, describe the tasks to be performed and how these are related to the overall project. No significant part of the research or substantive effort under a NSF grant may be contracted or otherwise transferred to another organization without prior NSF authorization (this excludes the procurement of items such as commercially available supplies, materials, equipment or general support services allowable under the grant). The intent to enter into such arrangements should be disclosed in the proposal.

Each subaward shall use a proposal budget, providing details of subaward costs by cost category. Each subawardee budget must be prepared in FastLane.

Purchases of analytical or other routine services from commercial sources and the acquisition of fabricated components from commercial sources are not regarded as reportable subaward activity. Such items -- routine analytical or other routine services -- should be reported in the Budget under Other Direct Costs/Other. All research, including subawards and consultancies, must be carried out in the U.S. (See definition of Place of Performance <http://www.eng.nsf.gov/sbirspecs/Definitions/definitions.htm#place.>)

Part 7. Equivalent or Overlapping Proposals to other Federal Agencies. A firm may elect to submit proposals for essentially equivalent or overlapping work under other Federal program solicitations or may have received or expect to receive other Federal awards for essentially equivalent or overlapping work. In these cases, the proposer **MUST** inform NSF of related proposals and awards and must first certify on the Proposal Cover page whether the proposer (a) has received Federal government awards for related work, or (b) has submitted currently active proposals for similar work under other Federal government program solicitations or (c) intends to submit proposals for such work to other agencies during the year. For all such cases, the following information is required:

- The name, address and telephone contact of the sponsoring agency to which the proposal was or will be submitted;
- Date(s) of proposal submission(s);
- Title, number, and date of Solicitation under which the proposal was submitted or will be submitted;
- Title and performance period of the proposal; and
- Name and title of Principal Investigator (person-months (per year) (calendar-months) devoted by any personnel on the equivalent or overlapping project who are participating as PI or senior personnel on this proposal)

If no equivalent or overlapping proposals are under consideration, explicitly state: **NONE**. NSF will not make awards that essentially duplicate research funded (or expected to be funded) by other agencies, although in some cases NSF may fund portions of work described in an overlapping proposal provided that the budgets appropriately reduce costs and allocate costs among the various sponsors. **IF A PROPOSER FAILS TO DISCLOSE EQUIVALENT OR OVERLAPPING PROPOSALS AS PROVIDED IN THIS SECTION, THE PROPOSER COULD BE LIABLE FOR ADMINISTRATIVE, CIVIL, OR CRIMINAL SANCTIONS.**

A.5.4. References Cited (counts as 1 page). Provide a comprehensive listing of relevant reference sources, including patent numbers and other relevant intellectual property citations.

A.5.5. Biographical Sketches (counts as 1 page). Provide relevant biographical information for the Principal Investigator and key personnel (including key members of your subaward team). Include information on present and past employment, education (highest degree and year), and professional experience. Provide a listing of relevant publications and summarize other contributions to the technical literature not directly pertinent to this proposal.

A.5.6. Budget (counts as 1 page). The total budget may not exceed \$100,000 for the SBIR/STTR Phase I proposal. Budget estimates must be shown in detail on the budget justification. The budget should reflect the cost for work to be done only after the effective date of the award. Note that an awardee may not expend funds for any costs associated with the project before the effective date of the award document signed by the NSF Grants Officer.

List the Principal Investigator and senior personnel by name with their time commitments budgeted in person-months and the dollar amount for the performance period.

The reimbursement rates for consultants are a direct cost that cannot exceed \$498 per day. Indicate the number of days proposed per consultant. Consultant travel should be shown under the travel category.

The budget justification should indicate the type of expendable materials and supplies required with their estimated costs.

Permanent equipment and foreign travel are not allowed in the Phase I budget.

One trip to the National Science Foundation to attend a two-day Grantees Workshop and to discuss the research program with a SBIR/STTR Program Manager must be included in the Phase I budget.

Reasonable fees (estimated profit) will be considered under Phase I. The amount of the fee approved by NSF cannot exceed seven percent (7%) of the total indirect and direct project costs. Cost sharing is permitted; however, it is not required nor will it be a factor in the evaluation of a proposal.

Detailed documentation of budget line items is required and should be documented on the budget justification page.

A.5.7. Current and Pending Support of Principal Investigator and Senior Personnel (counts as 1 page). This section should provide information about all research to which the Principal Investigator and other senior personnel either have committed time or have planned to commit time (in the event that other pending projects are supported during the SBIR/STTR Phase I period of performance), whether or not salary for the person involved is included in the budgets of the various projects. If none, state NONE.

For all on-going or proposed projects or proposals that will be submitted in the near future -- but excluding any proposals already cited above in the Equivalent or Overlapping Proposals to other Federal Agencies section -- that involve the Principal Investigator or senior personnel, provide the following information:

- Name of sponsoring organization.
- Title and performance period of the proposal.
- Person-months (per year) (calendar months) devoted to the project by the Principal Investigator and each of the senior personnel.

A.5.8. Equipment, Instrumentation, Computers and Facilities (counts as 1 page). Provide a description that specifies the availability and location of significant equipment, instrumentation, computers, and physical facilities necessary to complete that portion of the research that is to be carried out by the proposing firm in Phase I. Purchase of permanent equipment is not permitted in a Phase I project. NSF will not reimburse the costs of permanent equipment in a Phase I project.

If the equipment, instrumentation, computers, and facilities for this research are not the property (owned or leased) of the proposing firm, include a statement signed by the owner or lessor which affirms the availability of these facilities for use in the proposed research, reasonable lease or rental costs for their use, and any other associated costs. Scan statements into this section.

A.5.9. Supplementary Docs (does not count towards the page count). **NOTE: These sections are required. Failure to provide complete information will result in your proposal NOT being considered further. This section will contain the following components:**

- **Company Commercialization History: (All questions MUST be answered.)** Firms that have received one or more SBIR/STTR Phase II awards from NSF or other Federal agencies must submit a report on Company Commercialization History. The Company Commercialization History will be included in the overall review of a proposal. If a company has never received a SBIR/STTR Phase II award, state **ZERO** awards. The following are necessary components for this section:

1. Firm Name:

2. Total Number of SBIR/STTR Awards Firm Received from the Federal Government: (This includes all Phase I and Phase II awards.)

3. Percentage of the Firm's Revenues from the most recent Fiscal Year from Federal SBIR and/or STTR funding.

4. Identify each Phase II SBIR/STTR award the firm has received by agency, date of award, and include award number.

5. Total sales revenue to Date from the Commercialization Results of these Awards.

6. Follow-on Funding Received from Government Sources

7. Follow-on Funding Received from Private Sources: Using the following definitions to determine your responses to this section. Sales - sales of products or services resulting from the technology developed and result of the Phase II award. Include revenue from the sale of technology or rights. Specify the sales revenues in dollars (1) to government agencies (federal, state, local and/or foreign) and (2) to the private sector. Include sales made by your firm as well as the sales of other organizations who have licensed or acquired the technology. Non-SBIR/STTR funding - government or private sector funds to further develop the technology (including R&D, manufacturing, marketing, etc.) associated with this Phase II project. Apportion sales/funding - if two or more Phase II projects contributed to a single product or technology right that has been sold or received non-SBIR/STTR funding among the contributing projects. For example, Phase II projects A and B lead to the sale of a new product/process/software ...to the DoD for a total of \$10 million and to retail software stores for \$12 million. Under the heading "Government Sales" put \$5 million and under the heading "Private Sector Sales" put \$6 million for both Phase II projects A and B.

8. Apportion Sales Revenue and Non-SBIR/STTR Funding Amount of the various Phase II projects without double counting:

- Government Sales:
- Private Sector Sales:

A.5.10. Cooperative Research Agreement (For STTR proposals only). See the Cooperative Agreement web page for a model

http://www.eng.nsf.gov/sbirspeccs/Phase_II/Cooperative_Agreement/cooperative_agreement.htm.

The proposing small business concern must provide a written cooperative agreement between the small business concern and the research institution. The cooperative agreement must be signed by both parties at the time of award.

A.5.11. List of Suggested Reviewers (does not count toward the page count). Provide a listing of reviewers that you consider to be experts in the field. Provide complete contact information in the "Suggested Reviewers" text box. Please keep in mind potential conflict-of-interests.

Likewise, provide a listing of individuals that you wish not to be considered as a reviewer. Provide information in the "Reviewers not to include" text box.

A.6. Research Topics

The fundamental mission of NSF is to promote discoveries and to advance education across the frontiers of knowledge in science and engineering. Consistent with that mission, NSF encourages and supports a wide range of proposals from the research and education community and also from the private small business sector. These proposals are reviewed under NSF's new merit review criteria, which cover both the quality of research and its potential impact on society.

The SBIR/STTR program solicits proposals from the small business sector consistent with NSF's mission. The program is governed by Public Law 106-554. A main purpose of the legislation is "to stimulate technological innovation and increase private sector commercialization." The NSF SBIR/STTR program is therefore in a unique position to meet both the goals of NSF and the purpose of the SBIR legislation by emphasizing private sector commercialization and by transforming scientific discovery into social benefits. Accordingly, NSF has formulated four broad solicitation topics for SBIR/STTR that conform to the high-technology investment sector's interest:

- Advanced Materials and Manufacturing Systems (AM) <http://www.eng.nsf.gov/sbirspeccs/AM/am.htm> ;
- Biotechnology (BT) <http://www.eng.nsf.gov/sbirspeccs/BT/bt.htm> ;
- Electronics (EL) <http://www.eng.nsf.gov/sbirspeccs/EL/el.htm> ;
- Information-Based Technologies (IT) <http://www.eng.nsf.gov/sbirspeccs/IT/it.htm> ;

These broad technology topics encompass virtually all of the scientific and engineering disciplines that are represented at NSF. Please read thoroughly the descriptions of all four solicitation topics in their entirety and select the topic that best reflects the area where your novel idea would have the most potential impact in the marketplace. That topic must be specified on the cover page of your proposal and coded to the most specific level possible. For example, if you propose research on electronic sensors that measure physical properties, your proposal cover page should specify topic EL (Electronics), subtopic A (Detectors, Sensors, Instruments, and Systems), and area 1 (Physical Property Measurement).

Proposers are reminded to identify the program solicitation number (NSF-02-056) in the program announcement/solicitation block on the proposal Cover Sheet. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

B. Budgetary Information

Cost sharing is not required in proposals submitted under this Program Solicitation.

Other Budgetary Limitations: SBIR/STTR Phase I project budgets cannot exceed \$100,000 (for more information see V. Proposal Preparation and Submission Instructions Section A.5.6. Budget)

C. Deadline/Target Dates

Proposals must be submitted by the following date(s):

Full Proposals by 5:00 PM local time:

June 12, 2002 Opening: March 1, 2002 Topics:
Advanced Materials and Manufacturing
Systems (AM) and Information-Based
Technologies (IT)

January 22, 2003 Opening: October 1, 2002 Topics:
Biotechnology (BT) and Electronics (EL)

D. FastLane Requirements

Proposers are required to prepare and submit all proposals for this Program Solicitation through the FastLane system. Detailed instructions for proposal preparation and submission via FastLane are available at: <http://www.fastlane.nsf.gov/a1/newstan.htm>. For FastLane user support, call 1-800-673-6188 or e-mail fastlane@nsf.gov.

Submission of Electronically Signed Cover Sheets. The Authorized Organizational Representative (AOR) must electronically sign the proposal Cover Sheet to submit the required proposal certifications (see [Chapter II, Section C](#) of the Grant Proposal Guide for a listing of the certifications). The AOR must provide the required certifications within five working days following the electronic submission of the proposal. Further instructions regarding this process are available on the FastLane website at: <http://www.fastlane.nsf.gov>.

VI. PROPOSAL REVIEW INFORMATION

A. NSF Proposal Review Process

Reviews of proposals submitted to NSF are solicited from peers with expertise in the substantive area of the proposed research or education project. These reviewers are selected by Program Officers charged with the oversight of the review process. NSF invites the proposer to suggest, at the time of submission, the names of appropriate or inappropriate reviewers. Care is taken to ensure that reviewers have no conflicts with the proposer. Special efforts are made to recruit reviewers from non-academic institutions, minority-serving institutions, or adjacent disciplines to that principally addressed in the proposal.

The two merit review criteria are listed below. The criteria include considerations that help define them. These considerations are suggestions and not all will apply to any given proposal. While proposers must address both merit review criteria, reviewers will be asked to address only those considerations that are relevant to the proposal being considered and for which he/she is qualified to make judgements.

What is the intellectual merit of the proposed activity?

How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of the prior work.) To what extent does the proposed activity suggest and explore creative and original concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?

What are the broader impacts of the proposed activity?

How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?

NSF staff will give careful consideration to the following in making funding decisions:

Integration of Research and Education

One of the principal strategies in support of NSF's goals is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions provide abundant opportunities where individuals may concurrently assume responsibilities as researchers, educators, and students and where all can engage in joint efforts that infuse education with the excitement of discovery and enrich research through the diversity of learning perspectives.

Integrating Diversity into NSF Programs, Projects, and Activities

Broadening opportunities and enabling the participation of all citizens -- women and men, underrepresented minorities, and persons with disabilities -- is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

Additional Review Criteria

The SBIR/STTR program has **additional criteria** (as listed below) that are associated with the "standard" NSF review criteria.

What is the intellectual merit of the proposed activity?

1. Is the proposed plan a sound approach for establishing technical and commercial feasibility? 2. Does the proposal reflect state-of-the-art in the major research activities proposed? (Are advancements in state-of-the-art likely?)

What are the broader impacts of the proposed activity?

1. What may be the commercial and societal benefits of the proposed activity? 2. Does the proposal lead to enabling technologies (instrumentation, software, etc.) for further discoveries? 3. Does the outcome of the proposed activity lead to a marketable product or process? Evaluate the competitive advantage of this technology vs. alternate technologies that can meet the same market needs. 4. How well is the proposed activity positioned to attract further funding from non-SBIR sources once the SBIR project ends? 5. Can the product or process developed in the project advance NSF's goals in research and education? 6. Does the proposed activity broaden the participation of underrepresented groups (e.g. gender, ethnicity, disability, geography, etc.)? 7. Has the proposing firm successfully commercialized SBIR/STTR supported technology where prior awards have been made?

A summary rating and accompanying narrative will be completed and submitted by each reviewer. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers, are sent to the Principal Investigator/Project Director by the Program Director. In addition, the proposer will receive an explanation of the decision to award or decline funding.

B. Review Protocol and Associated Customer Service Standard

All proposals are carefully reviewed by at least three other persons outside NSF who are experts in the particular field represented by the proposal. Proposals submitted in response to this announcement/solicitation will be reviewed by Mail and/or Panel Review.

Reviewers will be asked to formulate a recommendation to either support or decline each proposal. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

NSF is striving to be able to tell applicants whether their proposals have been declined or recommended for funding within six months for 70 percent of proposals. The time interval begins on the date of receipt. The interval ends when the Division Director accepts the Program Officer's recommendation.

In all cases, after programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements for review of business, financial, and policy implications and the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at its own risk.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made to *the submitting organization* by a Grants Officer in the Division of Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program Division administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator. (See section VI.A. for additional information on the review process.)

B. Award Conditions

An NSF award consists of: (1) the award letter, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award letter; (4) the applicable award conditions, such as Grant General Conditions (NSF-GC-1)* or Federal Demonstration Partnership (FDP) Terms and Conditions;* and (5) any announcement or other NSF issuance that may be incorporated by reference in the award letter. Cooperative agreement awards also are administered in accordance with NSF Cooperative Agreement Terms and Conditions (CA-1). Electronic mail notification is the preferred way to transmit NSF awards to organizations that have electronic mail capabilities and have requested such notification from the Division of Grants and Agreements.

*These documents may be accessed electronically on NSF's Web site at http://www.nsf.gov/home/grants/grants_gac.htm. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (301) 947-2722 or by e-mail from pubs@nsf.gov.

More comprehensive information on NSF Award Conditions is contained in the NSF *Grant Policy Manual* (GPM) Chapter II, available electronically on the NSF Web site at <http://www.nsf.gov/cgi-bin/getpub?gpm>. The GPM is also for sale through the Superintendent of Documents, Government Printing Office (GPO), Washington, DC 20402. The telephone number at GPO for subscription information is (202) 512-1800. The GPM may be ordered through the GPO Web site at <http://www.gpo.gov>.

Special Award Conditions

SBIR/STTR Phase I and Phase II awards are subject to availability of funds. NSF has no obligation to make any specific number of SBIR/STTR Phase I or Phase II awards based on a solicitation, and may elect to make several or no awards in any specific technical topic or subtopic.

SBIR/STTR Phase I awards are fixed-price grants and will not exceed \$100,000. The SBIR/STTR Phase II fixed-price grants typically will not exceed \$500,000 per award. SBIR/STTR Phase II awards normally will be made for a 24-month period of performance. (For information on Phase II, please reference Phase II Proposal Preparation found on the SBIR/STTR web site. http://www.eng.nsf.gov/sbirspeccs/Award_Req/award_req.htm)

Reasonable fees for profit will be considered under both phases. Cost-sharing is permitted, however, it is not required, nor will it be a factor in the evaluation of a proposal.

C. Reporting Requirements

SBIR/STTR Phase I grantees must submit a Phase I Final Report prior to submitting a Phase II proposal. All reports must be prepared in FastLane. For additional support in preparing a report in FastLane please reference the FastLane Home Page; for grant guidance reference for Phase I: <http://www.nsf.gov/cgi-bin/getpub?sbiri98>. If more information is required please contact your NSF SBIR/STTR Program Officer.

Within 15 days after the expiration of an award, the PI also is required to submit a final project report. Approximately 30 days before expiration, NSF will send a notice to remind the PI of the requirement to file the final project report. Failure to provide final technical reports delays NSF review and processing of pending proposals for that PI. PIs should examine the formats of the required reports in advance to assure availability of required data.

NSF has implemented an electronic project reporting system, available through FastLane. This system permits electronic submission and updating of project reports, including information on project participants (individual and organizational), activities and findings, publications, and other specific products and contributions. PIs will not be required to re-enter information previously provided, either with a proposal or in earlier updates using the electronic system.

VIII. CONTACTS FOR ADDITIONAL INFORMATION

General inquiries regarding Small Business Innovation Research and Small Business Technology Transfer Programs Phase I Solicitation FY-2002 should be made to:

- Cheryl Albus, Advanced Materials & Manufacturing Systems, Program Manager, ENG, DMII, telephone: 703-292-7051, e-mail: calbus@nsf.gov.
- T. James Rudd, Advanced Materials & Manufacturing Systems, Program Manager, ENG, DMII, telephone: 703-292-4759, e-mail: tjrudd@nsf.gov.
- Rosemarie Wesson, Advanced Materials & Manufacturing Systems, Program Manager, ENG, DMII, telephone: 703-292-7070, e-mail: rwesson@nsf.gov.
- Om Sahai, Biotechnology, Program Manager, ENG, DMII, telephone: 703-292-7795, e-mail: osahai@nsf.gov.
- Winslow Sargeant, Electronics, Program Manager, ENG, DMII, telephone: 703-292-7313, e-mail: wsargeant@nsf.gov.
- Jean Bonney, Information-Based Technologies, Program Manager, ENG, DMII, telephone: 703-292-7054, e-mail: jbonney@nsf.gov.
- Sara Nerlove, Information-Based Technologies, Program Manager, ENG, DMII, telephone: 703-292-7077, e-mail: snerlove@nsf.gov.

For questions related to the use of FastLane, contact:

- Cheryl Albus, Program Manager, telephone: 703-292-7051, e-mail: calbus@nsf.gov.
- FastLane, telephone: 800-673-6188, e-mail: fastlane@nsf.gov.

IX. OTHER PROGRAMS OF INTEREST

The NSF *Guide to Programs* is a compilation of funding for research and education in science, mathematics, and engineering. The NSF *Guide to Programs* is available electronically at <http://www.nsf.gov/cgi-bin/getpub?gp>. General descriptions of NSF programs, research areas, and eligibility information for proposal submission are provided in each chapter.

Many NSF programs offer announcements or solicitations concerning specific proposal requirements. To obtain additional information about these requirements, contact the appropriate NSF program offices. Any changes in NSF's fiscal year programs occurring after press time for the *Guide to Programs* will be announced in the NSF [E-Bulletin](#), which is updated daily on the NSF web site at <http://www.nsf.gov/home/ebulletin>, and in individual program announcements/solicitations. Subscribers can also sign up for NSF's [Custom News Service](#) (<http://www.nsf.gov/home/cns/start.htm>) to be notified of new funding opportunities that become available.

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) funds research and education in most fields of science and engineering. Awardees are wholly responsible for conducting their project activities and preparing the results for publication. Thus, the Foundation does not assume responsibility for such findings or their interpretation.

NSF welcomes proposals from all qualified scientists, engineers and educators. The Foundation strongly encourages women, minorities and persons with disabilities to compete fully in its programs. In accordance with Federal statutes, regulations and NSF policies, no person on grounds of race, color, age, sex, national origin or disability shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving financial assistance from NSF (unless otherwise specified in the eligibility requirements for a particular program).

Facilitation Awards for Scientists and Engineers with Disabilities (FASSED) provide funding for special assistance or equipment to enable persons with disabilities (investigators and other staff, including student research assistants) to work on NSF-supported projects. See the program announcement/solicitation for further information.

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation about NSF programs, employment or general information. TDD may be accessed at (703) 292-5090, FIRS at 1-800-877-8339.

The National Science Foundation is committed to making all of the information we publish easy to understand. If you have a suggestion about how to improve the clarity of this document or other NSF-published materials, please contact us at plainlanguage@nsf.gov.

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to applicant institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies needing information as part of the review process or in order to coordinate programs; and to another Federal agency, court or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 63 Federal Register 267 (January 5, 1998), and NSF-51, "Reviewer/Proposal File and Associated Records," 63 Federal Register 268 (January 5, 1998). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

Pursuant to 5 CFR 1320.5(b), an agency may not conduct or sponsor, and a person is not required to respond to an information collection unless it displays a valid OMB control number. The OMB control number for this collection is 3145-0058. Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding this burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to: Suzanne Plimpton, Reports Clearance Officer, Division of Administrative Services, National Science Foundation, Arlington, VA 22230, or to Office of Information and Regulatory Affairs of OMB, Attention: Desk Officer for National Science Foundation (3145-0058), 725 17th Street, N.W. Room 10235, Washington, D.C. 20503.

OMB control number: 3145-0058.